"Smoking in Relation to Physical Complaints," Archives of Environmental Health, 1961.

TABLE 12.—*Percentage of Current Regular Cigarette Smokers with Moderate and Severe Cough: By Nicotine Content of Main Stream Smoke, by Age, by Sex, and by Number of Cigarettes Smoked per Day*

No. of Cigarettes per Day	Men						Women					
	0.4 to 1.1 Mg.		1.2 to 1.8 Mg.		1.9 to 2.7 Mg.		0.4 to 1.1 Mg.		1.2 to 1.8 Mg.		1.9 to 2.7 Mg.	
	No. *	% †	No.	%	No.	%	No.	%	No.	%	No.	%
Age 30-39:												
1-9	7	--	17	--	8	--	62	1.6	73	1.4	57	7.0
10-19	7	--	31	3.2	34	8.8	56	5.4	99	9.1	114	14.9
20	34	11.8	94	7.4	106	10.4	46	13.2	122	16.4	133	18.8
21-39	24	--	57	21.1	61	16.4	18	--	39	41.0	34	20.6
Age 40-49:												
1-9	29	--	81	8.9	65	12.3	163	1.8	213	7.5	198	5.6
10-19	44	6.8	150	7.3	175	8.6	186	9.1	322	13.0	297	9.4
20	77	10.4	312	16.7	412	22.3	153	13.7	354	15.5	341	17.9
21-39	93	21.5	214	23.4	272	31.6	66	24.2	102	24.5	98	29.6
40+	42	35.7	127	40.9	161	32.9	17	--	28	--	38	31.2
Age 50-59:												
1-9	31	19.4	82	9.8	93	7.5	116	3.4	186	7.0	139	7.2
10-19	53	11.3	159	17.0	212	16.0	146	9.6	207	10.6	192	13.5
20	107	15.9	366	23.8	516	25.6	128	15.6	224	21.4	203	15.7
21-39	91	24.2	205	23.4	260	27.7	40	17.5	57	24.6	40	30.0
40+	61	41.0	142	41.5	153	41.2	16	--	20	--	25	--
Age 60-69:												
1-9	16	--	46	41.5	52	26.9	61	9.8	76	7.9	53	5.7
10-19	24	--	93	25.8	102	17.6	44	11.4	46	8.7	43	11.6
20	48	27.1	160	32.5	199	29.6	37	16.2	48	20.8	52	30.8
21-39	13	--	53	43.4	57	47.4	11	--	10	--	6	--

* Number of subjects.
† Percentage with moderate or severe cough.

Nicotine and Tar

Cigarette smokers were asked what brand of cigarettes they smoked and whether they smoked filter-tip or nonfilter-tip cigarettes. Data on the nicotine and tar content of the main stream smoke of popular brand cigarettes sold in 1959 (shortly before the start of our study) were determined by Foster D. Snell, Inc., consulting chemist and engineers, for the *Reader's Digest* and were published in the November, 1959, issue in an article by Lois Mattox Miller and James Monahan.[11] With these data, we were able to classify the subjects according to the tar and nicotine content of the cigarettes they usually smoked. Tar and nicotine content are closely related. With a few minor exceptions, cigarettes which are low in nicotine are also low in tar, and vice versa.

Table 12 shows the findings on cough in relation to nicotine content of cigarette smoke. As with previous tables on inhalation, the subjects are divided by age, sex, and number of cigarettes smoked per day; percentages with cough are shown only for categories in which there were 30 or more subjects.

Although the trends are not consistent in all age-sex groups, it appears that, in general, the percentage of cigarette smokers reporting a moderate or severe cough increases with nicotine content of the main stream smoke.

In order to get an over-all picture, the data were standardized to the distribution by age and number of cigarettes smoked per day among all current regular cigarette smokers in the study. This was done separately for men and for women. Only age-sex groups in which there were 30 or more subjects in each of the 3 categories of nicotine level were included.

Among males, the standardized percentages with a moderate or severe cough were:

of association with smoking (notably, coughing, shortness of breath, and loss of appetite) while others (including some not listed above) showed only a relatively small degree of association with smoking.

Cigarette smoking showed a far higher degree of association with physical complaints than did cigar or pipe smoking.

The frequency of physical complaints increased with amount of cigarette smoking.

Coughing was reported less frequently by people who smoke cigarettes with a low tar and nicotine content than by people who smoke cigarettes with a high tar and nicotine content.

It is suggested that smoking produces coughing, shortness of breath, loss of appetite, and certain other complaints in susceptible individuals. It is also suggested that these complaints sometimes have the effect of inducing individuals to smoke less, inhale less, switch to low nicotine cigarettes, or give up smoking.

Among women between the ages of 30 and 49, irregularity of menstruation was reported somewhat more frequently by smokers than by nonsmokers.

Nervous tension was found to be associated with smoking. It may be that nervous tension increases the tendency to smoke heavily, but it may also be that smoking increases nervous tension in some individuals. (Both could be true.)

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The social cost of sickness is incalculable. The prevention of disease is for the most part a matter of education, the cost is moderate, and results certain and easily demonstrated.—HAVEN EMERSON, M.D., *The Social Cost of Sickness*, 1915. (Reprinted in *Selected Papers of Haven Emerson*, W. K. Kellogg Foundation, 1949, p. 31.)

19.4% for those smoking cigarettes with less than 1.2 mg. of nicotine; 22.6% for 1.2 to 1.8 mg. of nicotine, and 24.4% for 1.9 mg. or more of nicotine. Among females, the corresponding percentages were: 10.3% for less than 1.2 mg. of nicotine; 13.2% for 1.2 to 1.8 mg. of nicotine, and 14.1% for 1.9 mg. or more of nicotine. The percentages given above for males should not be directly compared with the percentages given for females, since the distribution of subjects by age in relation to number of cigarettes smoked per day is different in the 2 sexes.

Shortness of breath (moderate or severe) showed a relationship with the nicotine content of cigarettes smoked by women, the standardized percentages with this complaint being 6.3% for women who smoked cigarettes with less than 1.2 mg. of nicotine; 8.4% for 1.2 to 1.8 mg. of nicotine, and 8.9% for 1.9 mg. or more of nicotine. However, no such relationship was found in men, the standardized percentages being 14.3%, 14.9%, and 14.3% respectively.

Pain in the chest (moderate or severe) showed little if any relationship with nicotine content of cigarettes. The standardized percentages for men were 4.7% for less than 1.2 mg. of nicotine; 5.7% for 1.2 to 1.8 mg. nicotine, and 5.1% for 1.9 mg. or more of nicotine. The corresponding percentages for women were 4.6%, 5.0%, and 3.8% respectively.

Loss of appetite (disregarding degree) showed some relationship with nicotine content of cigarettes. The standardized percentages for men were 4.7%, 6.7%, and 7.1% respectively and for women 5.8%, 5.7%, and 6.7% respectively for under 1.2 mg., 1.2 to 1.8 mg., and 1.9 mg. or more of nicotine.

Comment

Most of the physical complaints considered here can vary in degree from slightly annoying to extremely unpleasant for the individual concerned. In a certan proportion of cases they are symptomatic of the presence of a serious disease or a condition likely to develop into a serious disease. Thus, the association found between smoking habits and certain physical complaints may be of considerable importance.

I should now like to discuss the possible nature of the observed associations between smoking and physical complaints, using cough as an example.

It can hardly be doubted that smoking can evoke coughing in some individuals. (Witness what happens to many people the first time they inhale tobacco smoke.) This would seem to provide a sufficient explanation of the association found between smoking and coughing. However, I would like to suggest that coughing may also have an influence on smoking habits. Some evidence for this was found in a study in which former cigarette smokers were asked why they gave up the habit.[10] In other words, I am suggesting what may be called a "feed back" mechanism, where smoking produces coughing, which in turn has an influence on smoking habits. Some examples follow.

Coughing was reported less frequently by cigar and pipe smokers than by cigarette smokers. Yet, it is a common experience among many smokers that inhalation of cigar or pipe smoke often results in immediate coughing (or a feeling of nausea), while a large percentage of smokers can inhale cigarette smoke without immediately coughing. I suggest that the immediate cough (or nausea) response to the inhalation of cigar or pipe smoke results in the avoidance of inhalation of smoke from cigars or pipes. This is reflected in the finding that few cigar and pipe smokers inhale more than slightly, while many cigarette smokers inhale moderately or deeply.[7] The strength of cigar and pipe smoke provides such an immediate penalty for inhaling the smoke that inhalation is avoided to the degree that the frequency of delayed (or chronic) cough is reduced far below the level which would be found in a controlled experiment in which subjects were forced to inhale regardless of the consequences.